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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/691,119	10/19/2000	Tetsuo Ono	503.36911VX1	2259

20457 7590 04/16/2003

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EXAMINER

OLSEN, ALLAN W

ART UNIT	PAPER NUMBER
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1763

6

DATE MAILED: 04/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/691,119

Applicant(s)

ONO ET AL.

Examiner

Allan W. Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 8-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☒ Certified copies of the priority documents have been received in Application No. 09/249,292.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's affirmation of the election of Group 1, claims 1-7, in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2 and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 6,093,332 issued to Winniczek et al. (hereinafter, Winniczek) in view of U.S. Patent 5,405,795 issued to Beyer et al. (hereinafter, Beyer).

Winniczek teaches a method directed to reducing mask erosion during the etching of sub-micron features into substrates. Winniczek teaches using a high density plasma to etch the substrate. Winniczek teaches applying a time modulated RF bias to the substrate while the substrate is being etched. Winniczek teaches using an RF bias frequency of greater than 100 kHz (e.g., 4 MHz). Winniczek teaches modulating the bias with a modulation frequency of between 0.1 Hz and 1000 Hz. Winniczek teaches that the layer being etched (104) and the underlying substrate (106) may each comprise

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more than one layer. Winniczek teaches that the layer being etched may be polysilicon or a metal. See: column 1, lines 30-46; column 4, lines 15-40; column 8, lines 30-45

Winniczek does not teach that the layer underlying the layer being etched has a thickness of 6 nm or less. Winniczek does not teach that the layer underlying the layer being etched is a gate oxide.

Beyer teaches a gate structure wherein a 5-10 nm thick gate oxide underlies a layer of polysilicon.

It would have been obvious to one skilled in the art to use Winniczek's method to pattern the gate structure of Beyer because it is taught that the benefits of Winniczek's method (e.g., reduced mask erosion, maximized etch rate, vertical etch profile) may realized while etching a layer of polysilicon without regard to what underlies the polysilicon. Therefore, in using Winniczek's method to etch the polysilicon of Beyer, one would meet the instantly claimed limitation that requires the presence of a gate oxide with a thickness of 6 nm or less, underneath the layer being etched.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winniczek/Beyer as applied to claim 1 above, and further in view of U.S. Patent 5,378,311 issued to Nagayama et al. (hereinafter, Nagayama).

In addition to the above noted teachings, it is further noted that Winniczek teaches that the method is not dependent upon the composition of the etchant and the specific etchant that is used should be chosen according to the composition of the layer that is to be etched. See column 8, lines 25-29.

Neither of Winniczek or Beyer teach using an etchant that is a mixture of chlorine and oxygen.

Nagayama teaches using an etchant that is a mixture of chlorine and oxygen to etch polysilicon.

It would have been obvious to one skilled in the art to use an etchant comprising a mixture of chlorine and oxygen when using the combined teachings of Winniczek and Beyer to etch polysilicon because, as noted above, the combination of Winniczek and Beyer is obvious and Winniczek teaches that the selection of the particular etchant should be based upon the particular material that is to be etched and Beyer teaches etching polysilicon and Nagayama teaches that polysilicon is etched with a plasma comprising chlorine and oxygen.

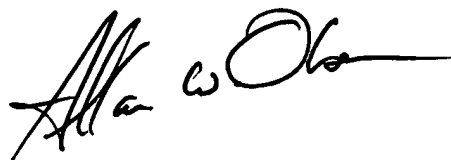
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 703-306-9075. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached on 703-308-2333.

The general fax numbers for TC1700 are 703-872-9310 (non-after finals) and 703-872-9311(after-final).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.
April 12, 2003

A handwritten signature in black ink, appearing to read 'Allan Olsen', with a stylized flourish at the end.